Bacteria Turn Fats and Oils Into Plastics

Microbial fermentation is turning vegetable oils and animal fats into biodegradable industrial materials. Certain microorganisms, when grown on fats and oils, can produce poly(hydroxyalkanoate) polymers, or PHAs. When fed excessive carbon and deprived of other nutrients, bacteria like *Pseudomonas resinovorans* produce these plasticlike substances as a survival mechanism. The polymers are either rigid or elastomeric, depending on their chemical structure, the organism that produces them, and the fat or oil feedstock.

Since PHAs break down naturally over time, they are suitable for a wide range of environmentally friendly medical and consumer products ranging from adhesives to plastics and films. Scientists want to control the PHA properties to make them suitable for diverse industrial uses. The properties vary with the fatty acid composition of the feedstock source. *Richard D. Ashby, Daniel K.Y. Solaiman, USDA-ARS Hides, Lipids, and Wool Research Unit, Wyndmoor, Pennsylvania; phone (215) 233-6483 [Ashby] - 6476 [Solaiman], e-mail rashby@arserrc.gov, dsolaiman@arserrc.gov.*

Tanning Innovation Might Boost Meat Safety

Microorganisms present on the hair of food animals at the time of slaughter—such as *Escherichia coli* O157:H7, *Salmonella,* and *Listeria monocytogenes*—can contaminate meat and sometimes cause illness in consumers. Research shows that removing hairs from cattle hides before skinning significantly reduces the threat of meat contamination. Now, a 10-year-old hair-removal method has been improved to reduce both processing costs and environmental impact.

The patented process begins with spraying a sodium sulfide solution on the carcass hide, which breaks protein bonds within hair fibers and allows their easy removal. Then a sulfide-neutralizing agent is applied. Packers can now remove most of the hair, split the hide, and send the top layer for tanning and the rest for other uses. This saves time and money, allows early-stage inspection of the hide's grain layer, and reduces shipments of low-quality hides to tanners. The method is being implemented by Future Beef Operations, LLC, in a new Kansas plant. *Andrew G. Gehring, USDA-ARS Hides, Lipids, and Wool Research Unit, Wyndmoor, Pennsylvania; phone (215) 233-6491, e-mail agehring@arserrc.gov.*

Cool, New Aquaculture Research Center

A 50,000-square-foot facility for investigating production of cool- and cold-water species of food fish has been opened in Leetown, West Virginia. Work there will complement catfish research under way at Stoneville, Mississippi, and on warm-water species at Stuttgart, Arkansas. The focus will be on fish genetics and breeding, health, nutrition, and production—all for species that thrive in water temperatures ranging from 39˚F to 68˚F. Initially, these will be trout and other salmonids, but studies of other species will be added later.

Domestic aquaculture producers now meet 10 percent of U.S. consumer needs for fish and rank 10th in the world for value of production. Eventually, 12 scientists at the new center will be developing new collaborative programs with other state and national research institutions. *William Hershberger, National Center for Cool and Cold Water Aquaculture, Leetown, West Virginia; phone (304) 724-8340, e-mail bhershbe@afrs.ars.usda.gov.*

Measuring Your Antioxidant Protection

Some important antioxidants, such as lycopene and beta-carotene, circulate in the lipid portion of human plasma. Until now, assays for antioxidant capability have only peered into the water portion, where water-soluble antioxidants like vitamin C settle. As a result, the effects of lipid-loving antioxidants seemed to disappear in human blood.

A new assay that measures oxidation in both lipid and water environments gives a more accurate picture of total antioxidant capacity of biological samples. It should one day help health professionals make better recommendations about individual antioxidant needs to protect against cancer, heart disease, and other age-related diseases thought to evolve from oxidative damage to cell components. *Kyung-Jin Yeum, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, Massachusetts; phone (617) 556-3128, e-mail kyeum@hnrc.tufts.edu.*

More Potent Chromium in Your Diet

The typical Western diet barely provides adequate levels of the essential trace element chromium—set at 35 micrograms (mcg) daily for men, 25 mcg for women. Since the mineral appears to improve insulin function, a shortfall can reduce the body's ability to remove excess sugar from the blood. High sugar intakes, trauma, and hard exercise can increase chromium excretion, worsening an already marginal status.

Extra dietary chromium from supplements may improve glucose tolerance in people who have difficulty managing their blood sugar levels. A patent is being sought for a more potent formulation that is more readily absorbed—up to 50 percent better—than chromium picolinate. That formulation is the best-absorbed and most popular chromium supplement sold today. The new technology, already available for licensing, combines chromium and the amino acid histidine. *Richard A. Anderson, USDA-ARS Nutrient Requirements and Functions Laboratory, Beltsville, Maryland; phone (301) 504-8091, e-mail anderson@307.bhnrc.usda.gov.*